aquatic biota. A second-tier analysis based on mean concentrations of these three radionuclides of those values above detection resulted in a sum of fractions value of 0.29. The results of the second-tier analysis indicate that dose rates are below the guidance level associated with the 1.0-rad-per-day criterion adopted by DOE for screening dose rates to aquatic organisms.

The results of the RESRAD assessment indicate that the actual dose rates to aquatic organisms are below a population-effect level. There are no guidelines for radiological effects to individuals, which is important in evaluating impacts to threatened and endangered species. The studies that were completed for the 1.0-rad-per-day criterion were based on exposures to organisms for 1 year, and then normalized to a dose rate based on a day. One can interpret these results to mean that a dose rate of 1.0 rad per day, if sustained for a year, would have an effect on some individuals but not on the population as a whole. Based on monitoring results from 2000 to 2002 and on the life styles of the endangered fish around the Moab site, radionuclides in ground water discharging to the river currently are not expected to adversely affect the aquatic environment.

In its site-specific assessment, the USGS concluded that there would be “no significant biological impacts to fish populations caused by radionuclide concentrations sampled in the Colorado River and sediments.” It found that “radiochemical concentrations are elevated in ground water below the Moab pile; however, these waters do not result in a high radiation exposure to fish” (USGS 2002).

Ground water extraction near the Colorado River and the use of freshwater injection would further decrease the maximum concentrations of radionuclides in the shoreline of the Moab site. These activities would be necessary for reducing impacts from chemical contaminants. They would also reduce the potential for radiological effects to individuals, which is important to endangered species as well as populations.

A1−8.0 Analysis for Terrestrial Species

A1−8.1 Species Accounts and Status in the Proposed Action Area

Spatial data for federally listed plant and animal species were obtained from the Utah Conservation Data Center (UCDC). This data set was compiled by the Utah Natural Heritage Program (UNHP) of the UDWR, in which species occurrences are depicted as points at a scale of 1:24,000 on 7.5-minute topographic quad maps. Spatial data depicting the project areas were overlaid on the spatial data depicting the occurrence of species of concern. Table A1−4 summarizes the listing status for terrestrial species discussed in this BA.

Table A1−4. Status of Terrestrial Species

Common Name	Scientific Name	Status	Federal Register Citation
Plants			
Jones' cycladenia	*Cycladenia jonesii*	Threatened	51 FR 16526–16530 (1986)
Navajo sedge	*Carex specuicola*	Threatened	50 FR 19370–19374 (1985)
Clay phacelia	*Phacelia argillosa*	Endangered	43 FR 44810–44812 (1978)
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened, but proposed for delisting	64 FR 36454–36464 (1999)
California condor	*Gymnogyps californianus*	Endangered	61 FR 54043–54060 (1996)
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	66 FR 8530–8553 (2001)
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	62 FR 39129–39147 (1997)
Gunnison sage grouse	*Centrocercus minimus*	Candidate	67 FR 40657–40679 (2002)
Western yellow-billed cuckoo	*Coccyzus americanus*	Candidate	66 FR 38611–38626 (2001)
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	67 FR 57558–57567 (2002)
White-tailed prairie dog	*Cynomys leucurus*	Species of Concern	67 FR 57558–57567 (2002)

A1−8.1.1 Jones' Cycladenia

Jones' cycladenia is an herbaceous perennial 4 to 6 inches tall and is the only member of its genus in the Intermountain West.

Distribution. Jones' cycladenia has a disjunct distribution, occurring in the canyonlands of the Colorado Plateau in four counties in Utah: Emery, Garfield, Grand, and Kane, and in Coconino County, Arizona (UDWR 2003b). There is a cluster of known populations on BLM land in Grand County approximately 11 to 17 miles northeast of Moab (UDWR 2003b).

Soils and Community Associations. Jones' cycladenia grows in gypsiferous soils that are derived from the Summerville, Cutler, and Chinle Formations; they are shallow, fine-textured, and intermixed with rock fragments. The species can be found in eriogonum-ephedra, mixed desert shrub, and scattered piñon-juniper communities, at elevations ranging from 4,000 to 6,800 ft (UDWR 2003b). The Grand County populations in Castle Valley and along Onion Creek are growing in mixed desert shrub and in the lower edge of the piñon-pine and juniper community at 4,920 to 5,580 ft on sparsely vegetated hills derived from arkosic (containing unweathered feldspar) sandstone of the Cutler Formation.

Threats. The primary threat to Jones' cycladenia is habitat disturbance.

Critical Habitat. No critical habitat has been designated for this species (USF&WS 2003b).

Known Occurrences in the Project Area. There were no occurrences of Jones' cycladenia in any of the quads that contain project areas.

Findings. Jones' cycladenia would be most affected by habitat destruction. This species is not known to exist at or near any of the proposed disposal sites, transportation routes, or borrow areas. However, many of the potential project areas have not been well surveyed for this or other rare species. Therefore, prior to development of any disposal site, borrow area, or transportation route, a thorough survey of the area should be performed. If Jones' cycladenia were found, an alternate site would be considered or a mitigation plan would be developed to prevent adverse effects.

A1−8.1.2 Navajo Sedge

Distribution. Navajo sedge occurs in the canyons of Kane and San Juan counties in Utah, and in immediately adjacent Coconino County, Arizona (UDWR 2003b).

Soils and Community Associations. Navajo sedge is restricted to seep, spring, and hanging garden habitats in Navajo Sandstone, at elevations ranging from 3,770 to 5,980 ft (UDWR 2003b).

Critical Habitat. Critical habitat designated for this species consists of about 6,460 ft^2. This area contains the entire habitat occupied by the species where it occurs near Inscription House Ruin on the Navajo Indian Reservation in Coconino County, Arizona.

Threats. The primary threats to Navajo sedge and its critical habitat are spring development and sheep grazing (UDWR 2003b).

Known Occurrences in the Project Area. All of the known populations in Utah are located at least 20 miles southwest of the White Mesa Mill disposal site and associated borrow areas (UDWR 2003b).

Findings. Navajo sedge would be most affected by habitat destruction. This species is not known to exist at or near any of the proposed disposal sites, transportation routes, or borrow areas. However, many of the potential project areas have not been well surveyed for this or other rare species. Therefore, prior to development of any disposal site, borrow area, or transportation route; a thorough survey of the area should be performed. If Navajo sedge were found, an alternate site would be considered or a mitigation plan would be developed to prevent adverse effects.

A1−8.1.3 Clay Phacelia

Distribution. This species was included at the suggestion of BLM. Clay phacelia is thought to be restricted to Green River shales in Spanish Fork Canyon in Utah County, Utah (UDWR 2003b). However, UDWR (1998) suggests that specimens collected from Green River shales in Grand and Uinta counties, Utah, and in adjacent Colorado that were previously identified as *P. glandulosa* may properly belong to the endangered *P. argillosa*, based on seed morphology.

Findings. Based on current knowledge, it is unlikely that clay phacelia exists in the vicinity of any of the project sites. However, many of the potential project areas have not been well surveyed for this or other rare species. Therefore, prior to development of any disposal site, borrow area, or transportation route, a thorough survey of the area should be performed. In particular, areas that may have Green River shale should be examined for clay phacelia. In the unlikely event that this species were found, an alternate site would be considered or a mitigation plan would be developed, in cooperation with USF&WS and BLM, to prevent adverse effects.

A1−8.1.4 Bald Eagle

Habitat and Diet. The bald eagle is a bird of aquatic ecosystems. It frequents estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. Fish is the major component of its diet, but waterfowl, seagulls, and carrion are also eaten. The species may also use prairies if adequate food is available. Bald eagles usually nest in trees near water but are known to nest on cliffs; they rarely nest on the ground. Nest sites are usually in large trees along shorelines in relatively remote areas that are free of disturbance. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts.

Critical Habitat. No critical habitat has been designated for this species (USF&WS 2003b).

Known Occurrences in the Project Area. Only four nest sites were known in Utah as of 2000, three of them in the southeastern part of the state (UDWR 2003b). The nearest nest is at Cisco Landing on the Colorado River approximately 19 miles upriver from the Moab site. Utah has a large wintering bald eagle population scattered throughout the state. They are known to occur in winter and spring in the Matheson Wetlands Preserve (UDWR 2003b, Seglund 2004). The Utah Gap Analysis indicates that potential high-quality wintering habitat occurs in the vicinity of almost all the potential disposal sites and borrow areas (UDWR 1999). However, more recent information provided by UDWR (UDWR 2003b, Seglund 2004) indicates that bald eagles are not known to occur near any of these project sites.

Findings—Habitat and Human Disturbance. Bald eagles are not likely to be greatly affected by habitat destruction or by noise, lights, and human presence, since they do not nest at or near any of the project sites and may roost only occasionally in the vicinity of the Moab site. Activities at the Moab site would not remove any known bald eagle roost trees. Further, as indicated above, eagles probably rely more heavily on the large Matheson Wetlands Preserve than on the 50 acres of tamarisk at the Moab site.

The Utah Gap Analysis indicates that potential high-quality wintering habitat exists throughout the other project areas. Indeed, bald eagles could be found temporarily and infrequently using such areas when there are opportunities to feed on carrion, such as in big-game wintering areas or in prairie dog colonies. Therefore, it is possible that if traffic-related wildlife mortality increased due to the project, an increased number of eagles could be hit on highways. Although no data on this relationship are available, it is reasonable to assume that the number of eagles hit on highways would be proportional to the number of carrion available. The increase in the number of traffic-related wildlife mortalities would likely be small. Consequently, the potential increase in associated eagle deaths would also likely be small.

Findings—Exposure to Contaminants in Surface Water. If the bald eagle inhabits the vicinity of the Moab tailings pile, the most prevalent route of exposure to chemical and radioactive constituents would likely be from ingestion of prey and surface water in the nearshore environment. The potential for chronic effects from ingestion of chemical contaminants in food and surface water was evaluated for the No Action alternative using the osprey (*Pandion haliaetus*) as a surrogate (see Appendix A2 of the EIS). The maximum surface water concentrations of mercury and selenium exceeded no observed adverse effect level (NOAEL)- and lowest observed adverse effect level (LOAEL)-based food/drinking water benchmarks for the osprey (Sample et al. 1996). NOAEL benchmarks are values believed to represent nonhazardous concentrations. LOAEL benchmarks are threshold values for which chronic adverse effects are likely to become evident at the level of the individual.

Implicit in this benchmark is the assumption that the diet of the benchmark species (osprey) consists entirely of contaminated food/drinking water. In the context of the BA, this means that the food/water consumption of the analogous consultation species (i.e., the species for which the benchmark species is a reasonable surrogate—the bald eagle) would need to occur entirely within the surface waters of the nearshore environment within the contaminated portion of the river in order for the toxicological benchmark to be valid.

It is possible that eagles could consume fish from surface waters contaminated by ground water flowing beneath the tailings pile. However, because bald eagles generally forage over much larger areas and are present in the vicinity only during winter and spring, it is unlikely that enough contaminated food material would be obtained from the contaminated area to result in adverse toxicological effects.

Any potential effects to the bald eagle that could arise from exposure to radionuclides would be discountable (i.e., extremely unlikely to occur) (see Section A1–8.2 of this BA and Appendix A2 of the EIS).

Findings—Exposure to Contaminants at the Evaporation Pond(s). The bald eagle could potentially be affected by contaminant exposure at the evaporation pond(s) via ingestion of contaminated prey and water, dermal uptake of contaminated water and airborne contaminants, and inhalation of airborne contaminants.

As indicated above, eagles would probably rely more heavily on the large Matheson Wetlands Preserve than on habitat at the site of the Moab tailings pile, including the evaporation pond(s). The evaporation pond(s) would also be located in an area where project activities and site maintenance operations would create continual disturbance. Further, because of distance, disturbance, and the fact that the evaporation pond(s) would be located in an area that has been previously disturbed and is generally devoid of vegetation (which could provide perch and roost sites), the likelihood of visits from bald eagles would be small.

The evaporation pond(s) would be qualitatively monitored for general wildlife use, regardless of the potential presence of the bald eagle. Consequently, if it were determined that bald eagles were frequenting the evaporation pond(s), techniques to minimize or eliminate use would be identified and implemented. Techniques could include noise (e.g., propane boom cannons) or obstruction (e.g., netting).

If, during the course of the proposed actions, bald eagles were observed in the vicinity of any of the project sites, DOE would inform USF&WS, and reasonable and appropriate mitigation measures would be agreed upon and implemented in order to minimize or avoid potential impacts to the species. If impacts could not be avoided, additional Section 7 consultation would be required.

A1−8.1.5 California Condor

Historical Information. By the time Europeans arrived in western North America, California condors occurred in a narrow Pacific coastal strip from British Columbia, Canada, to Baja

California Norte, Mexico. By 1987, the California condor's range was reduced to a wishbone-shaped area encompassing six counties in southern California. Mortality factors include habitat loss; however, the factors that have been most important in decline of the species have not been determined. In 1987, the last wild condor was captured and taken to the San Diego Wild Animal Park. Beginning with the first successful captive breeding of California condors in 1988, the total population increased annually and stood at 121 individuals in 1996: 104 in the captive flock and 17 in the wild (USF&WS 1998b).

Habitat, Diet, and Reproduction. California condors lay only one egg every other year, on the floor of a cliff cavity or cave or in a crevice among boulders on a steep slope (UDWR 2003b). Cliffs and tall conifers, including dead snags, are generally used as roost sites in nesting areas. The California condor is an opportunistic scavenger, feeding only on carcasses. Although most roost sites are near nesting or foraging areas, scattered roost sites are located throughout its range.

Distribution in Utah. In Utah, condor sightings were historically rare, noted only twice by pioneers in the 1800s. A nonessential experimental population of California condors was established in northern Arizona in 1996 (61 FR 54043–54060 [1996]). However, sightings of birds that were released in northern Arizona have been made almost statewide in the late 1990s. The known distribution of the California condor in Utah currently consists of the southern third of the state, including most of San Juan County (UDWR 2003b).

Critical Habitat. Critical habitat has been designated for this species only within the state of California (42 FR 47840–47845 [1977]).

Known Occurrences in the Project Area. California condors are not known to regularly occur within the project area. Occasional transient individuals may be possible.

Findings. In addition to the lack of known occurrences in the project area, the sites that could be disturbed by project activities are minute compared to the apparently large areas required for foraging by California condors. Further, the proposed project areas include no known habitat features in particular that would be sought out or used by condors.

A1−8.1.6 Mexican Spotted Owl

Distribution. The Mexican spotted owl inhabits canyon and montane forest habitats across its range, which extends from southern Utah and Colorado, through Arizona, New Mexico, and west Texas, to the mountains of central Mexico (66 FR 8530–8553 [2001]).

Diet, Reproduction, and Migration. Mexican spotted owls do not nest every year and average about one young per pair (66 FR 8530–8553 [2001]). Their diet includes a variety of mammals, birds, reptiles, and insects (58 FR 14248–14271 [1993]) but consists most commonly of small- and medium-sized rodents, such as woodrats, peromyscid mice, and microtine voles. Some individuals are year-round residents within an area, some remain in the same general area but show shifts in habitat use patterns, and some migrate short distances (12 to 31 miles) during winter, generally migrating to more open habitat at lower elevations (66 FR 8530–8553 [2001]).

Habitat. At the northern edge of their range in northeastern Arizona, southwestern Colorado, and Utah, Mexican spotted owls may occur year-round at 4,400 to 6,800 ft within the piñon-juniper zone below mixed-conifer forests (58 FR 14248–14271 [1993]). Within this zone, canyon habitats are used for nesting and roosting and are typically characterized by the cooler conditions found in steep, narrow canyons, often containing crevices, ledges, and/or caves (typically used for nest placement). These canyons frequently contain small clumps or stringers of ponderosa pine, Douglas fir, white fir, and/or piñon-juniper. Deciduous riparian and upland trees may also be present (66 FR 8530–8553 [2001]). However, Mexican spotted owls may also nest, but less frequently so, in arid, rocky, mostly unvegetated canyons (Romin 2004). Adjacent uplands are usually vegetated by a variety of plant associations, including piñon-juniper woodland, desert scrub vegetation, ponderosa pine-Gambel oak, ponderosa pine, or mixed conifer (66 FR 8530–8553 [2001]).

Threats. The Mexican spotted owl is threatened by destruction and modification of habitat caused by timber harvest and fires and increased predation associated with habitat fragmentation (58 FR 14248–14271 [1993]).

Critical Habitat. In 2001, approximately 4.6 million acres of critical habitat in Utah, Arizona, Colorado, and New Mexico were designated, with the majority occurring in Utah (3.2 million acres) (66 FR 8530–8553 [2001]). The critical habitat in Utah consists of five units, two of which (CP-13 and CP-14) are located in San Juan County (USF&WS 2003a).

Known Occurrences in the Project Area. Data provided by UDWR (2003a) indicated that there were no occurrences of the Mexican spotted owl in any of the quads that contained project areas. However, designated critical habitat occurs within 2 miles of the transportation corridor just south (within 25 miles) of the Moab site. Habitat models (BLM 2003b) also indicate that potential habitat areas may exist in the canyons near US-191 over the first 7 miles north from the Moab tailings pile. Nonetheless, these models are primarily based on physical and topographic features and do not consider vegetation requirements. Mexican spotted owls nest, roost, and forage in an array of different community types, but mixed-conifer forests dominated by Douglas fir and/or white fir are most common (58 FR 14248–14271 [1993]). However, as noted above, they may also nest, but less frequently so, in arid, rocky, mostly unvegetated canyons (Romin 2004). Although there are no forested areas in the vicinity of US-191 north of Moab, there are arid canyons that largely or altogether lack forest-type vegetation.

Findings. There are no known Mexican spotted owl occurrences or critical habitat within any of the project areas. However, owls could occur along US-191 over the first 7 miles north from the Moab tailings pile and, if present, could be disturbed by noise from increased truck traffic or from construction of a slurry pipeline.

The area in the vicinity of this section of transportation corridor constitutes a very popular recreation area, with heavy use by off-highway vehicles and mountain bikes. Although the increase in truck traffic noise could be detectable up to several miles from the highway, the existing off-highway vehicle noise and associated human presence would likely have a greater and more direct impact on the owls.

If a slurry pipeline option were selected, the route should be surveyed for Mexican spotted owls prior to construction. If any owls or potential habitat areas were identified, an appropriate mitigation plan would be developed to minimize potential adverse impacts, including scheduling activities such that owl nesting and fledging would not be disturbed. If impacts could not be avoided, additional Section 7 consultation would be required.

A1−8.1.7 Southwestern Willow Flycatcher

Range-Wide Distribution. The southwestern willow flycatcher's breeding range includes southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern portions of Nevada and Utah, and extreme northwestern Mexico. The subspecies most likely winters in Mexico, Central America, and perhaps northern South America (USF&WS 2002e).

Distribution in Utah. The recovery plan for the southwestern willow flycatcher places the northern limit of its breeding range in Utah south of the Moab site (USF&WS 2002e). In addition, UDWR (UDWR 2003a) specified only the southern parts of the state as the known distribution of this subspecies in Utah. However, the range line specified in the recovery plan (USF&WS 2002e) was recently extended to well north of the Moab site (USF&WS 2003d) because the subspecific identity of willow flycatchers remains unresolved in central Utah (due to the occurrence of a similar subspecies, *E.t. adastus*, at higher elevations in the central and northern part of the state) (USF&WS 2002e) and because it is believed that the Colorado and Green river systems may provide travel corridors and suitable habitat for the subspecies (USF&WS 2003d).

General Nesting Habitats. The southwestern willow flycatcher breeds in different types of dense riparian habitats, across a large elevational and geographic area. It usually breeds in patchy to dense riparian habitats along streams or other wetlands, near or adjacent to surface water or underlain by saturated soil. Common tree and shrub species comprising nesting habitat include willows (*Salix* spp.), seepwillow (aka mulefat; *Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), cottonwood (*Populus* spp.), arrowweed (*Tessaria sericea*), tamarisk (*Tamarix ramosissima*, also known as saltcedar), and Russian olive (*Eleagnus angustifolia*) (USF&WS 2002e).

Habitat characteristics such as plant species composition, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary across the subspecies' range. However, general unifying characteristics of flycatcher habitat can be identified. Regardless of the plant species composition or height, occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases, this dense vegetation occurs within the first 10 to 13 ft above the ground. These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense. In almost all cases, slow-moving or still surface water and/or saturated soil is present at or near breeding sites during wet or nondrought years (USF&WS 2002e).

Thickets of trees and shrubs used for nesting range in height from 6 to 98 ft. Lower-stature thickets (6 to 13 ft) tend to be found at higher elevation sites; tall-stature habitats are at middle- and lower-elevation riparian forests. Nest sites typically have dense foliage from the ground level up to approximately 13 ft above the ground, although dense foliage may exist only at the shrub level, or as a low dense canopy. Nest sites typically have a dense canopy, but nests may be placed in a tree at the edge of a habitat patch, with sparse canopy overhead. The diversity of nest site plant species may be low (e.g., monocultures of willow or tamarisk) or comparatively high. Nest site vegetation may be even- or uneven-aged, but is usually dense (USF&WS 2002e).

Historically, the southwestern willow flycatcher nested in native vegetation such as willows, buttonbush, boxelder, and *Baccharis*, sometimes with a scattered overstory of cottonwood. Following modern changes in riparian plant communities, the flycatcher still nests in native vegetation where available, but it also nests in thickets dominated by tamarisk and Russian olive and in habitats where native and non-native trees and shrubs are present in essentially even mixtures (USF&WS 2002e).

Nesting Habitats Dominated by Exotic Plants. Southwestern willow flycatchers nest in some riparian habitats dominated by exotics, primarily tamarisk and Russian olive. Most such exotic habitats range below 3,940 ft elevation and are nearly monotypic, dense stands of tamarisk or Russian olive that form a nearly continuous, closed canopy with no distinct overstory layer. Canopy height generally averages 16 to 33 ft, with canopy density uniformly high. The lower 6.5 ft of vegetation often consists of dense, dead branches. Thus, live foliage density may be relatively low from 0 to 6.5 ft above the ground but increases higher in the canopy (USF&WS 2002e).

Forty-seven percent of southwestern willow flycatcher territories occurred in mixed native/exotic habitat (more than 10 percent exotic), and 25 percent were at sites where tamarisk was dominant. Flycatchers nest in tamarisk at many river sites and, in many cases, use tamarisk even if native willows are present. Southwestern willow flycatchers nest in tamarisk at sites along the Colorado, Verde, Gila, San Pedro, Salt, Bill Williams, Santa Maria, and Big Sandy rivers in Arizona; Tonto Creek in Arizona; the Rio Grande and Gila rivers in New Mexico; the San Dieguito, lower San Luis Rey, and Sweetwater rivers in California; and Meadow Valley Wash and the Virgin River in Nevada. Rangewide, 86 percent of nests in mixed and exotic habitats were in tamarisk. In Arizona, 93 percent of the 758 nests documented from 1993 to 1999 in mixed and exotic habitats were in tamarisk. Tamarisk nests are at least as successful as nests in other substrates (USF&WS 2002e).

Because the physical and structural characteristics of tamarisk stands vary widely, not all have the same value as flycatcher breeding habitat. Among sites with tamarisk, suitable flycatcher breeding habitat usually occurs where the tamarisk is tall and dense, with surface water and/or wet soils present, and where it is intermixed with native riparian trees and shrubs. However, flycatchers breed in a few patches consisting of more than 90 percent tamarisk, with dry soils and surface water more than 600 ft away from some of their territories (USF&WS 2002e).

Suitable Nesting Habitat. “Suitable habitat” for southwestern willow flycatchers is defined as a riparian area with all the components needed to provide conditions suitable for breeding. These conditions are generally dense, mesic riparian shrub and tree communities 0.25 acre (minimum nest patch size) or greater in size within floodplains large enough to accommodate riparian patches at least 33 ft wide (USF&WS 2002e).

Diet and Reproduction. The nesting period of the southwestern willow flycatcher may vary depending on altitude and latitude. However, it generally begins in May with its arrival at breeding grounds and terminates with fledging in July and early August (USF&WS 2002e).

The southwestern willow flycatcher is an insectivore that forages within and occasionally above dense riparian vegetation, taking insects on the wing and gleaning them from foliage (USF&WS 2002e). According to DeLay et al. (2002) and Drost et al. (2001), southwestern willow flycatchers consume a variety of prey items, but the most prevalent included true bugs, bees and wasps, true flies, beetles, leafhoppers, and some spiders and dragonfly/damselflies. The southwestern willow flycatcher also may consume berries and seeds (USF&WS 2002e, UDWR 2003b).

Range-Wide Population Status and Nesting Areas in Utah. The total population of southwestern willow flycatchers across the species' range was estimated at 1,200 to 1,300 pairs in 2002. The population as a whole consists of extremely small, widely separated breeding groups. In Utah, for example, the willow flycatcher has been described as a common summer resident. However, there are few records concerning the breeding range in the southern portion of the state. Historically, southern Utah's largest flycatcher populations may have been those along the Colorado River and its tributaries in Glen Canyon; these are now inundated by Lake Powell. The flycatcher also bred along the Virgin River in the St. George area and along the San Juan River. Recent surveys have found the flycatcher absent as a breeding species on the Green and Colorado rivers in the Canyonlands National Park area, on the San Juan River (west of the New Mexico state line), and in portions of the Manti-La Sal National Forest. Flycatchers have recently bred in small numbers along the Virgin River near St. George, and single territories have been located at sites in the Panguitch Lake area and within Bryce Canyon National Park (USF&WS 2002e).

Threats. The reasons for the decline of the southwestern willow flycatcher and the current threats it faces are numerous, complex, and interrelated. The primary cause of the flycatcher's decline is loss and modification of habitat. Its riparian nesting habitat tends to be uncommon, isolated, and widely dispersed. Historically, these habitats have always been dynamic and unstable in place and time, due to natural disturbance and regeneration events such as floods, fire, and drought. With increasing human populations and the related industrial, agricultural, and urban developments, these habitats have been modified, reduced, and destroyed by mechanisms such as dams and reservoirs, diversions and ground water pumping, channelization and bank stabilization, phreatophyte control, livestock grazing, recreation, fire, agricultural development, and urbanization. Other factors include changes in abundance of other species (i.e., exotic plant species and brood parasitism), vulnerability of small populations (i.e., demographic effects and genetic effects), and migration and winter range stresses (USF&WS 2002e).

Critical Habitat. Critical habitat has been designated for this species in Arizona, California, and New Mexico (62 FR 39129–39147 [1997]); there is no designated critical habitat in Utah.

Occurrences in the Project Area. The UDWR database contained two records of southwestern willow flycatchers in two areas potentially affected by project activities. There was a reported but unconfirmed sighting of the southwestern willow flycatcher in 1998 in Grand County within the Moab quad that contains the Moab site (UDWR 2003b). There was a reported sighting in San Juan County in the vicinity of the slurry pipeline corridor in the La Sal West quad (UDWR 2003b). There is no information on the date of the reported sighting or on whether the sighting was confirmed.

The southwestern willow flycatcher has been identified as potentially occurring in the Matheson Wetlands Preserve and also several miles downstream from the Moab site. No nesting activity was observed in these areas, and the species has not been observed on the Moab site proper (NRC 1999). Surveys of potentially suitable habitat were conducted along the Colorado River, approximately 6 river miles south of the site in 2002. Willow flycatchers (subspecies not specified) were present during one survey in May (USGS 2002). The survey report concluded, after 3 years of study (1999 to 2001), that willow flycatchers were migrating through the area but were not breeding, and continued monitoring was recommended. On May 12, June 24, and July 10, 2004, DOE and UDWR conducted field surveys in the tamarisk habitat located along the easternmost boundary of the Moab site. This area had been historically identified as the only area on site containing potentially suitable flycatcher habitat. No flycatchers were detected, and UDWR concluded that this tamarisk constitutes only marginal nesting habitat at best (UDWR 2004).

Findings—Nesting Habitat. Based on the above studies, willow flycatchers occur in the vicinity of the Moab tailings pile and may occur in the vicinity of the White Mesa Mill site. Although it is unclear whether these birds belong to the listed southwestern, or *traillii,* subspecies, the former should be assumed in order to be conservative. Based on the above descriptions of nesting habitat dominated by exotic plants (USF&WS 2002e) and the 2004 field surveys conducted by DOE and UDWR (UDWR 2004), the tamarisk at the Moab tailings site should be considered marginally suitable nesting habitat.

Because riparian vegetation typically occurs in floodplain areas that are prone to periodic disturbance, suitable habitats will be ephemeral and their distribution dynamic in nature. Suitable habitat patches may become “unsuitable” (habitat that does not have the potential for developing into suitable habitat, even with extensive management) through maturation or disturbance (though this may be only temporary, and patches may cycle back into suitability). Therefore, it is not realistic to assume that any given suitable habitat patch (occupied or unoccupied) will remain continually occupied and/or suitable over the long term. Unoccupied suitable habitat will therefore play a vital role in the recovery of the flycatcher, because it will provide suitable areas for breeding flycatchers to (1) colonize as the population expands (numerically and geographically) and (2) colonize following loss or degradation of existing breeding sites. Indeed, many sites will likely pass through a stage of being suitable but unoccupied before they become occupied. “Potential” habitats (habitat that does not currently have all the components needed to provide suitable nesting habitat, but could, if managed appropriately, develop these components over time) that are not currently suitable will also be essential for flycatcher recovery, because they are the areas from which new suitable habitat develops as existing suitable sites are lost or degraded; in a dynamic riparian system, all suitable habitat starts as potential habitat. Further, even unsuitable habitats used as migration stopover areas may be critically important resources affecting productivity and survival (USF&WS 2002e).

Consequently, based on the above discussion of the dynamic nature of habitat suitability, removal of the currently marginally suitable tamarisk at the Moab site would result in temporary habitat loss for the southwestern willow flycatcher. However, this would not be the case if it were determined in the future (USF&WS 2003d) that the breeding range of the subspecies lies south of the Moab site (USF&WS 2002e). However, once remediation was completed, the lost tamarisk would be replaced with native riparian plant species of equal or higher functional value for the southwestern willow flycatcher. This would compensate for the habitat loss on the site.

Further, the size of the tamarisk stand at the Moab site (50 acres) is close to the mean patch size of breeding sites supporting 10 or more southwestern willow flycatcher territories (62.2 acres) (USF&WS 2002e). Consequently, the tamarisk habitat at the Moab site could be utilized by one or more pairs of the subspecies for nesting and/or during migration. Use of this habitat should be determined by field surveys during the most recent nesting and/or migration period(s) prior to its removal. If southwestern willow flycatchers were present during nesting and/or migration, and if impacts to the subspecies could not be avoided by removing habitat outside these periods, additional Section 7 consultation would be required.

Findings—Exposure to Contaminants in Surface Water. If the southwestern willow flycatcher occurs in the near vicinity of the Moab tailings pile, the most prevalent route of exposure to chemical and radioactive constituents would likely be from ingestion of prey and surface water in the nearshore environment. The potential for chronic effects from ingestion of chemical contaminants in surface water was evaluated for the No Action alternative using the rough-winged swallow (*Stelgidopteryx serripennis*) as a surrogate species (see Appendix A2 of the EIS). None of the maximum surface water concentrations of any of the chemical constituents exceeded NOAEL-based drinking water benchmarks for the rough-winged swallow (Sample et al. 1996). Consequently, no adverse effects to the southwestern willow flycatcher would be expected from surface water consumption within the nearshore environment of the contaminated portion of the river.

Any potential effects to the southwestern willow flycatcher that could arise from exposure to radionuclides in surface water would be negligible (see Section A1–8.2 of this BA and Appendix A2 of the EIS).

Findings—Exposure to Contaminants in Soils. Because the known diet of the southwestern willow flycatcher consists primarily of insects without aquatic life stages, exposure to chemical contaminants originating in surface water via ingestion of prey would be relatively minor. In contrast, some of these insects could have extensive contact with contaminants in surface soils. However, potential impacts associated with this route of exposure cannot be evaluated in the absence of soil contaminant data.

Exposure to chemical contaminants originating in soils could also arise from consumption of the berries and seeds of plants that accumulate such contaminants (see the evaluation of the potential effects of metals in the freshwater aquifer to terrestrial plants in Section A1−8.2). Further, exposure could arise from consumption of the terrestrial invertebrates that feed on the berries and seeds. However, potential impacts associated with these two routes of exposure cannot be evaluated in the absence of soil contaminant data.

Findings—Exposure to Contaminants at the Evaporation Pond(s). The southwestern willow flycatcher could be affected due to contaminant exposure at the evaporation pond(s) via ingestion of contaminated prey and water, dermal uptake of contaminated water and airborne contaminants, and inhalation of airborne contaminants.

The evaporation pond(s) would be built sufficiently high on the floodplain to withstand a 100-year flood event. The evaporation pond(s) would thus be located away from the river shoreline at an as-yet-unspecified distance. For this reason, and because estimated breeding territory sizes for the southwestern willow flycatcher are relatively small (generally from approximately 0.25 to 5.7 acres) (USF&WS 2002e), the evaporation pond(s) would likely be located well outside any breeding territories that could be located in association with riparian shoreline vegetation. The evaporation pond(s) would also be located in an area where project activities and site maintenance operations would create continual disturbance. Because of distance, disturbance, and the fact that the evaporation pond(s) would be located in an area that has been previously disturbed and is generally devoid of vegetation (in and over which the species generally forages [USF&WS 2002e]), the likelihood of visits from the southwestern willow flycatcher would be small. However, during the nesting period, adult southwestern willow flycatchers are known to sometimes fly outside their territory to gather food for their nestlings. Southwestern willow flycatchers may also use a larger area than their initial territory after their young are fledged and may use nonriparian habitats adjacent to the breeding area (USF&WS 2002e).

The evaporation pond(s) would be qualitatively monitored for general wildlife use, regardless of the potential presence of the southwestern willow flycatcher. Consequently, if it were determined that southwestern willow flycatchers were frequenting the evaporation pond(s), techniques to minimize or eliminate use would be identified and implemented. Techniques could include noise (e.g., propane boom cannons), visual deterrents (e.g., reflectors, silhouettes, effigies, water color), or obstruction (e.g., netting).

A1−8.1.8 Black-Footed Ferret

Historical Information. The black-footed ferret is the only ferret species native to North America. The historical range of the species, based on specimen collections, extends over 12 western states (Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming) and the Canadian provinces of Alberta and Saskatchewan.

Significant reductions in prairie dog numbers and distribution occurred during the last century due to widespread poisoning of prairie dogs, the conversion of native prairie to farmlands, and outbreaks of sylvatic plague. This resulted in near extinction of the black-footed ferret in the wild by the early 1970s. The species was believed extinct until 1981, when a small population was discovered near Meeteetse, Wyoming. In 1985 and 1986, the Meeteetse population declined to only 18 animals. Following this decline, the remaining individuals were taken into captivity in 1986 and 1987 to serve as founders for a captive propagation program.

Reintroductions. Since the late 1980s, highly successful captive breeding efforts have provided the basis for ferret reintroductions over a broad area of their formerly occupied range (Wyoming in 1991, South Dakota and Montana in 1994, Arizona in 1996, Montana in 1997, Colorado/Utah in 1999, South Dakota in 2000, and Mexico in 2001). The only black-footed ferrets currently occurring in the wild are believed to be the result of these reintroductions. Of all these reintroduction efforts, populations may have become self-sufficient at only one site in South Dakota.

The only ferret reintroduction in Utah was a nonessential experimental population in 1999. The experimental population area consisted of all of Uinta and Duchesne counties. (For purposes of Section 7 of the ESA, nonessential experimental populations are treated as species proposed for listing if they are located outside the National Wildlife Refuge System or National Park System). It was considered highly unlikely that ferrets could disperse outside the experimental area due to the area's large size, the absence of suitable surrounding habitat (lack of prairie dog towns), and the presence of vegetative and topographical barriers (63 FR 52824–52841 [1998]).

Dependence on Prairie Dogs. Black-footed ferrets depend almost exclusively on prairie dog colonies for food, shelter, and denning. The range of the ferret coincides with that of prairie dogs, and ferrets with young have been documented only in the vicinity of active prairie dog colonies. Historically, ferrets have been reported from black-tailed prairie dog (*Cynomys ludovicianus*), white-tailed prairie dog (*Cynomys leucurus*), and Gunnison's prairie dog (*Cynomys gunnisoni*) towns (67 FR 57558–57567 [2002]). Black-footed ferrets require prairie dog colonies of at least 100 to 150 acres in size (USF&WS 1988). Some of the white-tailed prairie dog colonies found from the Crescent Junction area southward toward the Klondike Flats alternative disposal site satisfy this size requirement (see Section A1−8.1.11).

Critical Habitat. No critical habitat has been designated for this species (USF&WS 2003a).

Known Occurrences in the Project Area. For reasons stated above, it is highly unlikely that black-footed ferrets reintroduced in Uinta and Duchesne counties in 1999 could occur on or in the vicinity of any of the project areas. However, unconfirmed sightings of naturally occurring ferrets persist throughout eastern Utah (UDWR 2003b). UDWR reported numerous but unconfirmed sightings of the black-footed ferret in the vicinity of the following project sites, with the year of the most recent observation provided parenthetically: Floy Wash Borrow Area (1989), Crescent Junction disposal site and Crescent Flat borrow area (1989), Courthouse Syncline borrow area and Klondike Flats disposal site (1989), and at five locations along the pipeline between the Moab site and the north IUC borrow area (1968 [Rill Creek quad], 1967 [Photograph Gap quad], 1996 [Monticello North quad], and 1996 [Monticello South quad]) (UDWR 2003b). Finally, there were confirmed sightings in the vicinity of the White Mesa Mill site in 1937 (UDWR 2003b).

Not all of the potential project areas have been fully surveyed for prairie dogs. However, surveys were conducted at the Klondike Flats site (BLM 1995). At that time, it was determined that all the colonies were relatively small and isolated, such that they would not support black-footed ferrets. It is believed that the colonies at the other proposed project sites are also too small to support ferrets.

Findings. It is unlikely that there are prairie dog colonies of sufficient size to support black-footed ferrets at any of the proposed project locations. However, this would be determined on a site-specific basis, since all project locations would be surveyed for white-tailed prairie dogs prior to disturbance (see Section A1−8.1.11). In addition, despite occasional unconfirmed sightings, it is believed that all black-footed ferrets currently in the wild are the result of the federal reintroduction program, and none of the reintroduced ferrets or their offspring are likely to now reside within the project areas.

A1−8.1.9 Western Yellow-Billed Cuckoo

General Distribution. The historical range of the western yellow-billed cuckoo included all states west of the Rocky Mountains and extended into southern British Columbia at the northern extent and into the northwestern states of Mexico at the southern limit. The cuckoo's population and range have been largely diminished since the subspecies was first described in 1877. Currently, the range of the cuckoo is limited to disjunct fragments of riparian habitats from northern Utah, western Colorado, southwestern Wyoming, and southeastern Idaho southward into northwestern Mexico and westward into southern Nevada and California.

Distribution in Utah. Historically, cuckoos were probably a common to uncommon summer resident in Utah and across the Great Basin. The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide (UDWR 2003b). There are at least two recent breeding records in Utah: one from the Ouray National Wildlife Refuge on the Green River in 1992 and one from the Matheson Wetlands Preserve in 1994.

Reproduction. The western yellow-billed cuckoo is one of the latest migrants to arrive and breed in Utah. They arrive in late May or early June, breed in late June through July, and start their southerly migration to northern South America by late August or early September. Yellow-billed cuckoo nesting behavior may be closely tied to food abundance. In years of low food abundance, cuckoos may forgo nesting; in years when the food supply is abundant, cuckoos may lay a large number of eggs (UDWR 2003b). Clutch size may consist of up to eight eggs but is usually two or three, and development of the young is very rapid, with a breeding cycle of 17 days from egg-laying to fledging. Although yellow-billed cuckoos usually raise their own young, they are facultative brood parasites, occasionally laying eggs in nests of other yellow-billed cuckoos or of other bird species.

Diet. Yellow-billed cuckoos feed almost entirely on large insects gleaned from tree and shrub foliage. They feed primarily on caterpillars, including tent caterpillars. They also feed frequently on grasshoppers, cicadas, beetles, and katydids, occasionally on lizards, frogs, and eggs of other birds, and rarely on berries and fruits (UDWR 2003b).

Nesting Habitat. Nesting habitat is classified as dense lowland riparian woodlands characterized by a dense subcanopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 333 ft of water. Overstory in these habitats may be either large, gallery-forming trees (33 to 90 ft) or developing trees (10 to 27 ft), usually cottonwoods. Nesting habitats are found at low to mid-elevations (2,500 to 6,000 ft) in Utah. Cuckoos may require large tracts (100 to 200 acres) of contiguous riparian nesting habitat. The yellow-billed cuckoo is thus considered a riparian obligate (UDWR 2003b).

Threats. Threats to the yellow-billed cuckoo and its habitat in Utah include habitat loss and fragmentation from flooding and dewatering, encroachment by non-native tamarisk, grazing, recreational impacts, and oil and gas development.

Known Occurrences in the Project Area. Yellow-billed cuckoos have been known to nest in the Matheson Wetlands Preserve across the river from the Moab site (66 FR 38611–38626 [2001]). However, the UDWR (2003a) does not have records of cuckoo occurrence near any of the project sites, and other recent surveys (Johnson 2002) have not detected cuckoos near the Moab site. There are no known stands of suitable habitat large enough to support nesting cuckoos at or near any of the alternate disposal sites, borrow areas, or transportation corridors, except in the Matheson Wetlands Preserve near the Moab site. Habitat at the Moab site is probably insufficient to support nesting cuckoos, although cuckoos could forage on the Moab site.

Findings—Foraging Habitat and Human Disturbance. Yellow-billed cuckoos may occur in the Matheson Wetlands Preserve across the river from the Moab tailings pile. Removal of the approximately 50 acres of tamarisk on the Moab site may reduce the value of the area for foraging but would not likely remove suitable nesting habitat. Increased noise and lighting could affect yellow-billed cuckoos. However, the nearest nesting sites (Matheson Wetlands Preserve) would probably be at least one-half mile from the construction activities at the Moab site. At that point, the maximum noise levels would be approximately 65 dBA, which is comparable to normal daytime noise levels in the town of Moab.

Findings—Exposure to Contaminants in Surface Water. The yellow-billed cuckoo is unlikely to spend much time near the Moab tailings pile, since it nests across the river in the Matheson Wetlands Preserve. However, if it does occur near the tailings pile, the most prevalent route of exposure to chemical and radioactive constituents would likely be from ingestion of prey and surface water in the nearshore environment. The potential for chronic effects from ingestion of chemical contaminants in surface water was evaluated for the No Action alternative using the American robin (*Turdus migratorius*) as a surrogate. Of the surrogate species available (Sample et al. 1996), the robin most closely approximated the diet and body size of the yellow-billed cuckoo. None of the maximum surface water concentrations of any of the chemical constituents exceeded NOAEL-based drinking water benchmarks for the robin (Sample et al. 1996). Consequently, no adverse effects to the yellow-billed cuckoo would be expected from surface water consumption within the nearshore environment.

Any potential effects to the yellow-billed cuckoo that could arise from exposure to radioactive constituents would be discountable (see Section A1–8.2 of this BA and Appendix A2 of the EIS).

Findings—Exposure to Contaminants in Soils. Because the known diet of the yellow-billed cuckoo consists of insects without aquatic life stages, there would be no exposure to chemical contaminants originating in surface water through ingestion of prey. In contrast, some of these food items could have extensive contact with contaminants in surface soils. Further exposure to chemical contaminants originating in soils could also arise from consumption of the berries and seeds of plants that accumulate such contaminants. However, the nature and extent of any effects that could result from exposure by the latter two pathways that are linked to soils are unknown and probably are relatively unimportant compared with the potential effects of habitat destruction.

Findings—Exposure to Contaminants at the Evaporation Pond(s). The yellow-billed cuckoo could potentially be affected by contaminant exposure at the evaporation pond(s) through ingestion of contaminated prey and water, dermal uptake of contaminated water and airborne contaminants, and inhalation of airborne contaminants.

The evaporation pond(s) would be located well outside any yellow-billed cuckoo breeding territories, since nesting would occur in the Matheson Wetlands Preserve on the opposite side of the river. Thus, it is unlikely that yellow-billed cuckoos would spend much time in the vicinity of the evaporation pond(s). Further, the evaporation pond(s) would also be located in an area where project activities and site maintenance operations would create continual disturbance. Because of distance, disturbance, and the fact that the evaporation pond(s) would be located in an area that has been previously disturbed and is generally devoid of vegetation (from which the species generally gleans its prey [UDWR 2003b]), the likelihood of visits from the yellow-billed cuckoo would be small.

The evaporation pond(s) would be qualitatively monitored for general wildlife use, regardless of the potential presence of the yellow-billed cuckoo. Consequently, if it were determined that yellow-billed cuckoos were frequenting the evaporation pond(s), techniques to minimize or eliminate use would be identified and implemented. Techniques could include noise (e.g., propane boom cannons), visual deterrents (e.g., reflectors, silhouettes, effigies, water color), or obstruction (e.g., netting).

A1−8.1.10 Gunnison Sage Grouse

Distribution. The Gunnison sage grouse is a newly identified species that is rare in Utah. It formerly occurred in areas of Utah, Colorado, Arizona, New Mexico, and Oklahoma (UDWR 2003b). The distribution of the species has been reduced to less than 25 percent of its historical range (67 FR 40657–40679 [2002]). It now occurs only in parts of southeastern Utah and southwestern Colorado. In Utah, the Gunnison sage grouse currently occurs only in eastern San Juan County near the Colorado state line.

Habitat, Diet, and Reproduction. The Gunnison sage grouse prefers sagebrush and sagebrush/grassland habitats. It feeds primarily on sagebrush and other plant material, although it also consumes insects. It is a colonial breeder that mates in the spring. Females lay a clutch of approximately eight eggs that hatch in about 1 month, and young can fly at 1 to 2 weeks of age (UDWR 2003b).

Threats. The distribution of the Gunnison sage grouse and quality of its habitat has been reduced in part by habitat loss and fragmentation (67 FR 40657–40679 [2002]); habitat loss appears to be the major threat (UDWR 2003b).

Known Occurrences in the Project Area. The Gunnison sage grouse has been observed in San Juan County in the vicinity of the proposed pipeline corridor between Moab and the White Mesa Mill site. Occurrences have been documented in the Monticello North and Monticello South quads in 1999 (UDWR 2003b), and there was a confirmed sighting with no date in the Devil Mesa quad in the vicinity of the proposed pipeline corridor (UDWR 2003b). Much of the area near the proposed slurry pipeline route between Moab and White Mesa is part of a Gunnison sage grouse conservation area (Sage Grouse Working Group 2000).

Findings. Habitat destruction is the greatest potential impact of the proposed project activities on the Gunnison sage grouse. However, most of the proposed pipeline route follows existing, already disturbed rights-of-way; therefore, relatively little habitat would likely be lost in those areas. Portions of the proposed pipeline that are not part of existing rights-of-way would be surveyed prior to development. If significant sage grouse habitat features were identified, an appropriate mitigation plan would be developed to minimize impacts. Sage grouse could also be disturbed by noise or human presence during critical periods of the year, especially during courtship, breeding, and nesting. To minimize these impacts, if a slurry pipeline option were selected, construction within potential sage grouse habitat would be scheduled to occur during portions of the year when these activities would not be disrupted.

A1−8.1.11 White-Tailed Prairie Dog

A petition to list the white-tailed prairie dog as threatened or endangered under the ESA was submitted by a group of environmental organizations in July 2002 (Center for Native Ecosystems 2002). USF&WS is currently evaluating this petition and is considering adding this species to the list of candidates for ESA protection. This species is considered here both because it is under candidate review and because another species considered here (the black-footed ferret) is closely tied to the white-tailed prairie dog in Utah.

Habitat and Distribution. The white-tailed prairie dog inhabits grasslands and shrublands ranging from southern Montana through Wyoming and into Colorado and eastern Utah. In Utah, the Gap Analysis indicates that critical value habitat is located in Rich County, much of Uinta County, southeastern Duchesne County, and the central portions of Grand and Emory counties.

Threats. Major threats to the white-tailed prairie dog are habitat loss, poisoning, and sylvatic plague (UDWR 2003b).

Known Occurrences in the Project Area. White-tailed prairie dog colonies are known to occur at the Crescent Junction alternative disposal site. Numerous colonies occur around the Crescent Junction area and extend south toward the Klondike Flats alternative disposal site, forming a complex of colonies ranging in size from 10 to 2,445 acres (Seglund 2004). BLM (1995) reported a number of colonies at the Klondike Flats site, most of which were fairly small and concentrated in drainage bottoms with more silt soil and more vegetation. White-tailed prairie dogs are also likely to occur at Floy Wash, Tenmile, Courthouse Syncline, and Blue Hills Road borrow areas, and potentially in the general vicinity of the Moab site, as well as along transportation corridors between the sites. The area from Moab south along US-191 toward the White Mesa Mill site supports colonies of Gunnison’s prairie dog (Seglund 2004); this area could also support white-tailed prairie dogs, since their ranges overlap in this region.

Findings. Development of any of the sites north of Moab would likely disturb some white-tailed prairie dog colonies. Impacts would be possible, but apparently less likely, if sites south of Moab were developed for this project.

Prior to development of any of the proposed project sites or transportation routes, the areas would be surveyed and the potential effects to white-tailed prairie dogs evaluated. DOE, in coordination with BLM, USF&WS, and UDWR, would develop reasonable and appropriate mitigation plans to minimize adverse impacts. If the white-tailed prairie dog became listed as threatened or endangered under the ESA prior to completion of project activities, and if impacts were identified and could not be avoided, additional Section 7 consultation would be required.

A1−8.2 Potential Effects of Proposed Actions on Terrestrial Species

The impacts described below would be applicable at the Moab site, under either on-site or off-site disposal alternatives.

Habitat Destruction. Habitat loss would likely be the greatest and most obvious impact to terrestrial species under any of the EIS alternatives, the extent of which would depend on the alternative selected. At the Moab site, approximately 439 acres would be directly affected. However, only approximately 50 acres currently support vegetation, and most of this is dominated by tamarisk. Development of borrow areas could disturb 100 to 550 acres of desert vegetation spread over at least three locations. If an alternative disposal site were selected, an additional 350 to 500 acres of desert vegetation could be affected. Under the on-site or off-site disposal alternatives, up to 60 acres of land could be affected by construction of one or more evaporation ponds and an associated small support facility near the Moab tailings pile. However, it is likely that the evaporation pond(s) would be located in an area that has been previously disturbed and thus supports little vegetation.

Traffic Mortality. Truck transportation of tailings materials from the Moab site to one of the alternative disposal sites would significantly increase the amount of truck traffic on US-191 either north or south of Moab. Normal traffic on US-191 north of Moab consists of approximately 2,800 to 3,000 vehicles per day, of which approximately 30 percent (840 to 1,000) are trucks. Transporting tailings would add another 200 to 400 truck round trips per day, an increase of from about 7 to 15 percent over the normal number of vehicles. This increase in traffic would likely lead to a marginal increase in traffic-related wildlife mortalities in the vicinity of US-191.

Noise. Noise from site construction and operations and from increased truck or rail transport could have adverse impacts on terrestrial biota in the vicinity of the Moab site as well as at the alternate disposal sites, borrow areas, and transportation corridors. Man-made noise can affect wildlife by inducing physiological changes, nest or habitat abandonment, or behavioral modifications. It may also disrupt communications required for breeding or defense (Larkin 1996). However, wildlife may also habituate to man-made noise (Larkin 1996). Much of the available data on noise effects focus on noise sources that are much more extreme than construction activities, such as aircraft overflights (Efroymson et al. 2000), and most of the existing data are species-specific. Consequently, only a general evaluation of potential noise impacts due to the proposed activities is possible without specific knowledge about the locations of species relative to the noise source and without specific data on the responses of these same species to construction noises.

The maximum noise level generated by construction equipment at the Moab site or at an alternative disposal site is estimated to be approximately 95 dBA measured at 49 ft. This noise level would decrease with distance, until it reached a level of approximately 65 dBA at 1,476 ft from the source (65 dBA is the normal daytime background level in Moab). At the more isolated sites, this noise level would attenuate over a distance of approximately 6 miles until it reached the quiet desert background level of approximately 30 dBA. At the Moab site, noise effects on local wildlife would likely be minimal, because the available habitat would be removed during the remediation process. However, there could be detectable elevated sound levels in habitats downstream and across the Colorado River resulting from work near the periphery of the Moab site.

The increased truck traffic along US-191 resulting from transport of materials from the Moab site to an alternative disposal site would likely increase ambient noise levels by approximately 5 dB (measured at 49 ft). Although the highway noise (average baseline approximately 70 dBA) may be detected over distances of 6 to 7 miles, the additional noise due to the additional trucks would not be perceptible (at least to humans) beyond several hundred yards.

Other Disturbances. Other potential impacts could result from increased human presence during remediation activities, such as those from supplemental lighting that could be employed for dual-shift or 24-hour operations at the Moab and alternative disposal sites. To the extent practicable, activities and worker presence near the periphery of the sites should be limited to minimize potential harassment of wildlife. If supplemental lighting were employed, the lights would be directed and/or sheltered to minimize the amount of light escaping the work site.

Chemical/Radiological Impacts. The potential for adverse effects resulting from wildlife and plant exposures to chemical and radiological constituents would be greater under the No Action alternative, which does not include ground water treatment, than under the on-site or off-site disposal alternatives that include ground water treatment. Consequently, the following summary of potential impacts to wildlife focuses on chemical and radiological constituents in surface water under the No Action alternative. A small section discussing potential impacts at the evaporation pond(s) is also included.

Chemical Impacts—Wildlife. At the Moab site, wildlife could be exposed to contaminants through ingestion of prey, water, and soil; dermal uptake; and inhalation of airborne contaminants. The primary pathway for wildlife exposure to contaminants would likely be through ingestion of prey in the riparian zone and prey and water in the surface waters of the nearshore environment.

The potential for chronic effects through ingestion of prey and water within the surface waters of the nearshore environment was evaluated as part of the process of selecting preliminary contaminants of potential concern in surface water. The selection process involved comparing maximum concentrations of 28 contaminants with detection limits, background concentrations, and toxicological benchmarks. Toxicological benchmarks consisted of drinking water and food/water benchmarks that would result in NOAEL and LOAEL for selected wildlife species (Sample et al. 1996).

Two of the 28 original contaminants, mercury and selenium, were identified as preliminary contaminants of potential concern because they had maximum concentrations that exceeded detection limits, background concentrations, and wildlife toxicological benchmarks (Sample et al. 1996) (see Appendix A2 of the EIS). The bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo are the only consultation species considered to be potentially present at the Moab site. The bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo are similar in lifestyle to three of the benchmark species. Consequently, potential impacts to the bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo are discussed in relation to these benchmark species in Sections A1−8.1.4, A1−8.1.7, and A1−8.1.9, respectively. In addition, the nine metals in the freshwater aquifer that are of potential concern to plants (discussed below) could become translocated to plant parts consumed by wildlife or terrestrial invertebrates that are in turn consumed by wildlife. The only consultation species that could be exposed to contaminants via this route are the southwestern willow flycatcher and western yellow-billed cuckoo. Potential impacts to the southwestern willow flycatcher and western yellow-billed cuckoo from this route of exposure are discussed briefly in Sections A1−8.1.7 and A1−8.1.9, respectively.

Chemical Impacts—Plants. Plants may be exposed to contaminants through root or dermal uptake of contaminants. Of these, root uptake would likely be the primary exposure pathway. Further, only root uptake is considered, since only phytotoxicity benchmarks based on root uptake were available. Of the contaminants listed for the freshwater aquifer in the SOWP (DOE 2003a), soil solution phytotoxicity benchmarks were available only for the metals (Efroymson et al. 1997). Maximum and mean concentrations of metals in the freshwater aquifer were obtained from the SOWP (DOE 2003a) and screened on the basis of their exceedance of these phytotoxicity benchmarks (see Appendix A2 of the EIS).

The following nine metals had maximum concentrations that exceeded maximum background concentrations and were slightly less than or exceeded phytoxicity benchmarks: aluminum, arsenic, cobalt, copper, iron, manganese, mercury, molybdenum, and vanadium (Appendix A2 of the EIS). Four of these metals had mean concentrations that were slightly below or above phytotoxicity benchmarks: arsenic, manganese, molybdenum, and vanadium (Appendix A2 of the EIS). These nine metals, but particularly the latter four, could cause phytotoxic effects, assuming that plants had root access to the freshwater aquifer or associated soil water above it.

However, there would be no potential phytotoxic effects to consultation plant species (Jones' cycladenia, Navajo sedge, and clay phacelia), since these are not known to occur at or near the Moab tailings pile (see Sections A1−8.1.1, A1−8.1.2, and A1−8.1.3, respectively).

Radiological Impacts—Wildlife and Plants. The following constituents have been monitored as contributors to radiological dose to terrestrial organisms in surface waters at the Moab site: lead-210, polonium-210, radium-226, radium-228, radon-222, thorium-230, uranium-234, and uranium-238, and the general indicators of radionuclides, gross alpha and gross beta. The RESRAD Biota Code (Version 1.0 Beta 3, June 3, 2003) was used to screen the total radiological dose to populations of generic (not species-specific) terrestrial (including riparian) animals and generic terrestrial (including riparian) plants based on maximum and mean concentrations of uranium-238, uranium-234, and radium-226 in surface water (DOE 2002b). These isotopes represent the highest values analyzed for radionuclides from 2000 to 2002.

The total radiological dose was estimated using the default parameters (e.g., bioaccumulation factors) provided in the RESRAD Biota Code, since such site-specific data were lacking. The total estimated radiological dose was compared to the applicable DOE dose limits or standards designed to protect populations of generic terrestrial animals and generic terrestrial plants.

The total radiological dose to a population of generic terrestrial plants based on maximum surface water concentrations was 9.87×10^{-6} rad/day, about 6 orders of magnitude below the DOE dose standard of 1 rad/day. The total radiological dose to a population of generic terrestrial animals based on maximum concentrations was 0.14 rad/day, slightly above the DOE dose standard of 0.1 rad/day. This could be of potential concern if riparian animals' total exposure occurred at the location where the maximum-concentration sample was taken. However, riparian vertebrates integrate their exposure over a much larger area. The total radiological dose to a population of generic terrestrial animals based on mean concentrations was 0.013 rad/day, about 1 order of magnitude below the DOE dose standard.

Consequently, there is no potential risk of radiotoxic effects to a population of generic riparian plants, and the risk of potential radiotoxic effects to a population of generic riparian vertebrates would be minimal from these radioactive constituents in surface water. Consequently, it follows that there would be minimal risk to the bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo, the only consultation species thought to be potentially present at the Moab site (see Sections A1−8.1.4, A1−8.1.7, and A1−8.1.9, respectively).

The results of the RESRAD assessment indicate that the actual dose rates to terrestrial animals are below a population-level effect. There are no guidelines for radiological effects to individuals, which is important in evaluating impacts to threatened and endangered species. The studies resulting in the 0.1-rad/day criterion for terrestrial animals were based on exposures to organisms for 1 year, and then normalized to a dose rate based on a day. One could interpret these results to mean that a dose rate of 0.1 rad/day, if sustained for a year, would have an effect on some individuals but not on the population as a whole. Based on the results of the RESRAD assessment and on the fact that the bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo would be present at the Moab site only seasonally, if at all, radionuclides are not expected to adversely affect these species.

Evaporation Pond(s). Potential impacts that could result from the construction and operation of one or more evaporation ponds include contaminant impacts to wildlife. The evaporation pond(s) could attract wildlife that could be affected due to contaminant exposure through ingestion of contaminated prey and water, dermal uptake of contaminated water and airborne contaminants, and inhalation of airborne contaminants. The bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo are the only terrestrial consultation species considered to be potentially present at the Moab site. Potential impacts to these species in connection with the evaporation pond(s) are discussed in Sections A1−8.1.4, A1−8.1.7, and A1−8.1.9, respectively.

A1−9.0 Determinations and Conclusions

The potential impacts of the action alternatives and the No Action alternative include physical, chemical, and/or radiological impacts as assessed in Sections A1−7.2 and A1−8.2. The degree and duration of the impacts would vary depending upon location, remediation methods, remediation goals, remediation period, transportation modes, and the potential presence of species and habitats.

DOE has made determinations regarding effects to federal threatened, endangered, and candidate species based on the information and assessment presented in Sections A1−7.0 and A1−8.0. This information was obtained in consultation with USF&WS and other federal and State agencies (e.g., BLM, UDWR). Because DOE's on-site and off-site remediation alternatives propose improvements to the existing environment, the determinations are made based on DOE's proposed actions and not on the effects of existing impacts (No Action alternative). It is emphasized that DOE's proposed action alternatives would mitigate existing risks to endangered species caused by historical surface and ground water contamination.

The determinations were made using the guidance provided in Chapter 3 of the USF&WS *Endangered Species Consultation Handbook* (USF&WS 1998b). These determinations serve as the basis for USF&WS to reach a jeopardy, or no jeopardy, finding in the Biological Opinion